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Twig Analysis and Isolation Results on Trees ARtificially Infested with Matsucoccus.

In the spring of 1936, several trees in a supposedly scale free, and comparatively blight free area in the Prescott National Forest, Cold Springs area, were artificially infested with Matsucoccus egg masses by Dr. West of Forest Entomology. By the spring of 1937 a number of the twigs on these trees had flagged. The Division of the Forest Pathology was later requested by Forest Entomology to collect, examine and culture some of these flags in order to determine whether or not they showed typical twig blight lesions and to find out what fungi were associated with them. This was done during the past summer at Prescott and 23 of the larger flags were collected, examined and cultured. The bulk of these twigs were not released to us until the later part of July and consequently, for the most part, they were in a badly dried out condition. It should be mentioned here that there was winter injury of moderate severity in the immediate vicinity of this plot. A similar experiment was initiated by Dr. West in Lynx Creek, a heavily blighted area, at the same time. Here, all trees remained healthy with the exception of a small suppressed one about 5 feet high which had died down to its lowest whorl of branches. Forest Pathology made no examination of material from this area.

Examination of Twigs

It was impossible to identify these twigs by their tags, as we were not furnished with data regarding the significance of the tag numbers. The twigs were brought in and numbered consecutively, regardless of tag numbers as there were usually several tags on each flagged twig.

However, a rough sketch of the twig was made showing the positions of the tags, wire baskets which had contained the egg nests, and cotton wrappings, as well as the locations of resined areas, and other pertinent data.

All of the 23 twigs examined had at least one, sometimes two or three resined lesions comparable to those found in natural twig blight flags. In lesioned areas the bark was typically resined in all cases but in several cases the wood was not solidly resined. It will be noted from Table 1 that the majority of lesions occurred in the 1934 and 1935 internodes and often involved the node between.

Ten of the flags had fruiting bodies of Cenangium sp. present, either visible on the surface or buried in the bark, while one had red fruits (a stage of the "white killer") present on the bark under a cotton wrapping which covered a small lesion.

Culture Results

The cultures for the most part, were made from the lesioned areas of the twigs. As seen from Table 1, eleven of the 23 twigs (47.8%) produced organism No. 1, "white killer". In most cases, this organism was found to be present in a high percentage of the chips, and was not difficult to separate from other fungi. It was the only fungus isolated from two twigs and, in several plates, was the most prevalent.

Six twigs (26.1%) produced organism No. 3, Cenangium sp. in culture. However, Cenangium fruits were present on several twigs which did not produce it in culture and vice-versa, so that in all, 13 twigs either had Cenangium fruits or produced it in culture. (The cultures were made from the resined areas in most cases while the fruits usually occurred above the lesion).

Fourteen twigs (60.9%) produced black colonies, which are classified as organism No. 4, believed to be strictly saprophytic.

Seven twigs (30.4%) produced brown colonies, none of which have sporulated in culture as yet. This is designated as organism # 2, and has shown some parasitic tendencies in recent inoculations.

Eight twigs (34.8%) produced the slow growing greyish white colonies, of organism No. 6, which at present is believed to have no connection with flagging.

Organism No. 7, produced by one twig, is a slow growing pycnidium-forming fungus, also believed to have no connection with the disease.

In addition, there were three other odd fungi and several colonies of Bacteria produced which were probably contaminants.

All of the above numbered organisms have been more or less commonly isolated from natural twig blight flags and the group includes most of the fungi which have been obtained from cultured flags.

Cultures of all of the fungi obtained have been purified and used as inocula[illegible] on healthy twigs. One set of these twigs was examined after having been in the field for 3 months. Twigs inoculated with organisms No. 1 and No. 2 showed lesions in both bark and wood. The cultures of No. 1 which were used appear to be a virulent strain, having produced resining down needle traces to the pith in inoculations where no wounds were made on the host.

More inoculations with these fungi have been put in and the results will be forthcoming at a later date.

Prescott, Arizona
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Table I. Cold Springs Scale Infested Twigs: Analysis and Isolations.

Twig No.	Cenangium Fruits	Red Fruits	No. of lesions	Where lesions occurred: nodes and internodes involved: 35 I	34-35N	34 I	33-34N	33 I	Isolations: Fungi recovered: Organism No. 1	2	3	4	6	7	Unclassified
1			2	x		x			x						
2	x		1			x			x			x	x		x
3	x		2		x	x			x			x			
4	x		1	x——x							x		x		
5	x		1		x				x				x		
6			1	x					x			x			
7			1	x——x					x		x		x		
8	x		1	x——x							x				
9	x		1			x				x					x
10	x		1	x——x——x					x		x	x			
11		x	2	x					x	x	x				
12	x		1		x——x							x			x
13			2	x——x		x						x			
14			1	x								x			
15			1				x			x	x	x		x	
16	x		1					x	x			x			
17			3	x		x			x	x		x	x		
18			1	x					x						
19			1	x								x			
20			1	x——x——x						x					
21	x		2	x——x——x								x	x		
22			4	x		x	x	x		x		x	x		
23			1		x——x					x		x	x		
Total	10	1	33	15	11	12	2	2	11	7	6	14	8	1	3
Percent									47.8	30.4	26.1	60.9	34.8	4.3%	